

different forms. One specimen, a dead shell, which may be of the same, is high, globose, diam. 25, alt. 21 mill., with the last whorl considerably descending towards the aperture, and the latter quite inferior and oblique, somewhat triangular, like that of *P. elevata*, but there are only a little over six whorls, and the spire is less conical.

P. thyroides Say. Common at both places, abundant on the hill-top at M; rather large, with strong shell and lip.

P. pennsylvanica Green. A few at P, shell rather high.

P. mitchelliana Lea. One at P, found by Dr. Ortmann.

P. palliata Say. A few at P.

P. appressa Say. Common at M, mostly young; abundant at P, mostly dead shells.

P. infecta Say. Common at P, quite small, diam. 9.5–10.5 mill.; color from light to brownish.

P. tridentata juxtidentis Pils. Common at P, small, with a narrow umbilicus, strong lip and high parietal lamina; the curve between the upper and lower "teeth" of the peristome is narrow and rather angular at the periphery, and in most specimens there is an additional thin lamella extending downward and inward from the upper tooth. From its whole configuration this form appears to represent a variety.

P. fraterna Say. At both places. In some specimens the umbilicus is covered or nearly so, in others rather open, and the base around the umbilicus is rather excavated, as in *P. monodon (leai)*. The surface of all is finely and densely hirsute, and the color is light brown.

P. stenotrema Fér. Common at P. There are two forms, one of them with a large notch in the peristome, and also otherwise different, as also seen from other places; a few notes on them will follow.

Bifidaria contracta Say. One at M.

B. tappaniana Ad. One at M.

NOTES ON ORIENTAL UNIONIDÆ.

BY L. S. FRIERSON.

The following notes are offered as so many "addenda et corrigenda" to Mr. Chas. T. Simpson's great work, "The Synopsis of the Naiades:"

UNIO VESTITUS Heude.

Described by R. P. Heude in 1883 in *Conch. Fluv. Nanking*, VIII, plate lviii, fig. 112, and plate lix, fig. 116.

Mr. Simpson very properly changed the specific name *vestitus*, it having, as he remarks, been preoccupied by Lea. Mr. Simpson erred, however, in thinking that the two figures represented different species, so diverse as to be placed in different genera, i. e., fig. 112 a *Quadrula*, and fig. 116 a *Schistodesmus*. The two figures are, as Heude says, one species. Mr. Simpson's new name for fig. 112, *Quadrula ovata*, will have precedence, and the shell being properly a *Schistodesmus* will therefore be called *Schistodesmus ovatus* Simpson, and Mr. Simpson's name for fig. 116, *Schistodesmus spinosus*, becomes a synonym.

UNIO COMPRESSUS Heude.

Conch. Fluv. Nank., III, 1877, plate xxiv, fig. 52.

This specific name, being preoccupied, was changed by Mr. Simpson and called by him *Ptychorynchus incertus* Simpson, and the *Unio murinus* of Heude placed as a synonym, although the *murinus* had been published some seventeen years previously. This slip, however, was corrected in the "Errata" by Mr. Simpson by placing *murinus* as the specific name, and *incertus* Simpson becomes obsolete. But Mr. Simpson evidently overlooked the fact that this name of *compressus* had been subsequently abandoned by Heude himself, and that its natural affinities had been pointed out by Heude not once but twice. So far from being so closely allied to the *Ptychorynchus murinus* Heude, it is not even entitled to being placed in the same genus at all, but is very close to the *Nodularia douglasiæ* Gray. In fact Heude in the first mention of the species (fig. 52, plate xxiv) calls attention to its kinship to the *Unio sculptus* Deshayes, which he figures on the same plate, and which figure Mr. Simpson places as a synonym of *douglasiæ*. Afterwards Heude abandoned the name *compressus* and substituted the name *subpressus* (*Conch. Fluv. Nank.*, IX, 1883, pl. lxx—"Remarks opposite"), which he then places as a variety of *douglasiæ* Gray.

(This whole double plate of *douglasiæ* Gray and its varieties, as given by Heude, is omitted by Mr. Simpson in the references under *Unio douglasiæ*, page 808, of the Synopsis.)

This shell, however, is a good species, allied to *douglasiæ*, but

differs in the truncated and much split-up cardinal teeth and the broadly rounded posterior end of the shell. The *compressus* of Heude will therefore be called *Nodularia subpressa* Heude.

(To be continued.)

THE DISCHARGE OF THE GLOCHIDIA IN THE UNIONIDÆ.

BY DR. A. E. ORTMANN.

Only Lea has published a few facts which bear upon the question of how the glochidia of the *Unionidæ*, contained in the marsupium, are set free (Observ., II, x), but some of his observations are entirely wrong. Further, Simpson (Pr. U. S. Mus. 22, '00, p. 616) believes that the "ovisacs" (which I call now placentulæ) of the genus *Strophitus* are discharged through the walls of the gills, which again is wrong.

According to my observations the glochidia are discharged in the natural way in the following species: *Quadrula subrotunda* (Lea), *Quadrula undulata* (Barn.), *Pleurobema coccineum* (Conr.), *Pleurobema æsopus* (Green), *Strophitus edentulus* (Say), *Symphynota costata* (Raf.), *Anodontoïdes ferussacianus* (Lea), *Anodonta imbecillis* Say.

This natural way is: they go from the water-tubes (ovisacs), inside of which they develop, into the suprabranchial canal, from this into the cloacal chamber, and thence go out of the soft parts and the shell by way of the anal opening.

In *Quadrula subrotunda*, *Pleurobema coccineum* and *æsopus*, the whole placentæ are discharged. In *Strophitus edentulus* the whole placentulæ are discharged, but sometimes the glochidia become free already in the suprabranchial canal. In the other four species named the glochidia are rather loose when discharged, and are issued in the form of irregular masses, which do not stick together, so as to preserve the shape of the placentæ.

Entirely different from these shells, which belong to the two sub-families of the *Unionidæ* and *Anodontinæ*, is the discharge in the *Lampsilinæ*. Here the glochidia do not go out by the natural channels, but break through the walls of the gills, at the edge of the marsupium, by small holes formed for this purpose, which close again after the discharge. Each ovisac (water-tube) has one hole at its distal end, and the glochidia are generally discharged in irregular masses, rather loosely connected, without preserving the shape of the